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(54) System for providing a laminate consisting of dough and fat.

(57) System for forming a laminate consisting of dough and fat, comprising in a single reducing station (1', 1") first (12, 16; 29, 31) and second (13, 17; 29, 33) reducing means which are each suitable for receiving a first (8) and second (10) ingoing layer consisting of dough and fat and for delivering a first (9) and second (11) outgoing layer, less thick than the respective ingoing layers, a laminating station (2') which is suitable for receiving the first outgoing layer (9), and for partially placing on each other of parts of the first outgoing layer (9) for forming and delivering the second outgoing layer (10), with a displacement direction opposite to the first outgoing layer (9), and comprising first to fourth conveyor means (4 to 7), having essentially parallel running conveyance directions for conveying the layers (8 to 11) thereon.

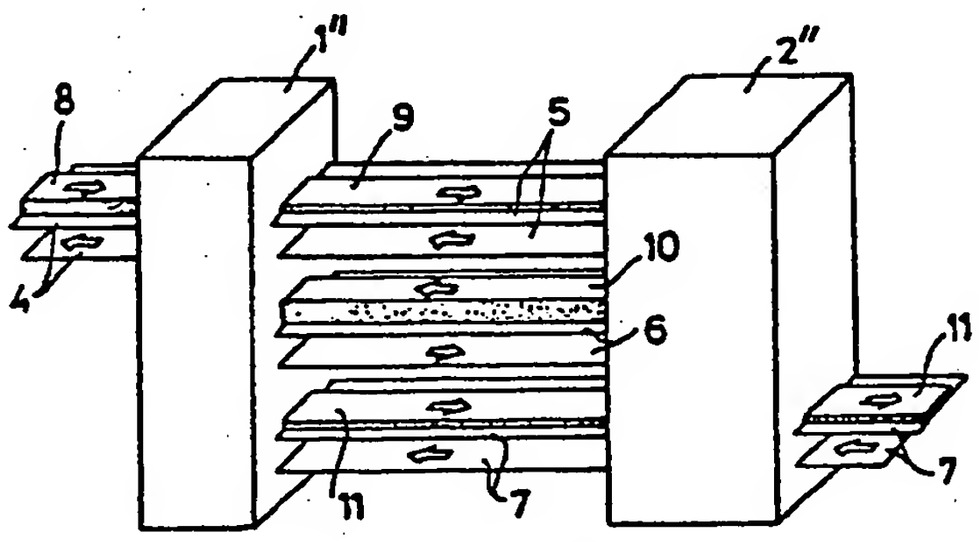

Fig. 3.

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through the laminating station 2', and the second outgoing layer 11 situated thereon is not processed in the laminating station 2'.

The first and second reducing means for reducing the thickness of the first and second ingoing layers 8, 10 to the first and second outgoing layers 9, 11 can each be formed by a pair of driven reduction elements disposed opposite each other and rotating in opposite directions about a horizontal axis, at least one reduction element of each pair being a roller-type roll with rollers supported on the periphery thereof and rotating about a horizontal axis, in such a way that there is a passage between the reduction elements of each pair for receiving therein the ingoing layer of the pair and delivering therefrom the outgoing layer of the pair. Such a pair of reduction elements is known from Dutch Patent Applications 7,714,214 and 8,304,377 in the name of Applicant.

Fig. 4 shows an embodiment of the reducing station 1' in which a first pair of reducing elements receiving the first ingoing layer 8 and a second pair of reducing elements receiving the second ingoing layer 10 are formed by a roller-type roll 12, 13 having disposed on the circumference thereof rollers 14, 15, and a plain roll 16, 17 disposed below the roller-type roll 12, 13 and forming a passage 18, 19 with the roller-type roll 12, 13. The roller-type rolls 12, 13, 16 and 17 are driven by means of drive means not shown, so that they rotate in the direction of the arrows 20, 21, 22 and 23 respectively.

The rollers 14, 15 are caused to rotate in the direction shown by arrows 26, 27 by means of a friction belt 24, 25 during rotation of the roller-type rolls 12, 13. The speeds of rotation of the roller-type rolls 12, 13 are so great that the peripheral speeds of the rollers 14, 15 are equal to the speed of the particular dough layer in the passage 18, 19, so that the respective layer is reduced in thickness by the rollers 14, 15, in the same way as a sheet of dough is reduced by rolling with a rolling pin by hand. The plain rolls 16, 17 can be moved in the directions indicated by the arrows 27, 28 in order to obtain a desired thickness of the first and second outgoing layers 9, 11.

It is pointed out that in the reducing station 1' the reduction elements of each pair 12, 16 and 13, 17 are interchangeable, each reduction element can be formed by a roll with rollers, and an endless belt such as that known from Dutch Patent Application 7,714,214 can be used instead of a plain roll.

Fig. 5 shows another embodiment of a reducing station 1'' of the preferred system according to the invention shown in Fig. 3. The reducing station 1'' comprises a single roller-type roll 29 with rollers 30 disposed on the periphery thereof, a top plain roll 31 which with the roller-type roll 29 forms a passage 32, and a bottom plain roll 33 which with the roll 29 forms a passage 34. The rolls 29, 31, 33 are rotatably driven by drive means not shown in the directions shown by the arrows 35, 36 and 37 respectively. The rollers 30 are caused to rotate during the rotation of the roller-type roll 35 in the direction indicated by the arrow 40 by means of a friction belt 38 guided over a number of rollers 30, the pressure of which against the rollers 30 can be set by means of a setting element 39. The roller-type rolls 31, 33 can be moved in the directions indicated by the arrows 41, 42, so that the thicknesses of the first and second outgoing layers 9, 11 can be set. As regards the speed of rotation of the roller-type roll 29, the same applies as for the roller-type rolls 12 and 13 of the reducing station 1' of Fig. 4.

In the reducing station 1'' the plain rolls 31, 33 can also be replaced by roller-type rolls, while the roller-type roll 29 could also be replaced by a plain roll, or the above-mentioned conveyor belts known from Dutch Patent Application 7,714,214 could be used for the plain rolls. The reducing station according to Fig. 5 has the great advantage compared with the reducing station according to Fig. 4 that one of the reducing elements, which in particular is an expensive roller-type roll, is used in common. The reducing station 1'' is thereby simpler, more compact and cheaper than the reducing station 1'.

Figs. 6 and 7 show two different embodiments of the laminating station 2' of the systems shown in Figs. 2 and 3, indicated by reference numbers 43 and 44 respectively. It is pointed out that for use of the stations 43, 44 with the system shown in Fig. 2 the conveyor belt 7 with the second outgoing layer 11 thereon is not present, but comes out of the reducing station 1' on the left in Fig. 2.

The two systems 43, 44 comprise a fifth conveyor means, in particular an endless conveyor belt 45, 46 and disposed at one discharge end thereof metering means 47, 48 which in embodiments of the system shown in Fig. 1 are known per se. In the known system the conveyor belts 45, 46 are, however, disposed in line with the second conveyor means 5 for receiving the first outgoing layer 9 on the conveyor belt 45, 46.

However, the laminating stations 43, 44 also contain deflecting means for deflecting the first outgoing layer 9 through an angle of 90 degrees in a horizontal plane. In the laminating stations 43, 44 shown the deflecting means are formed by a pair of belt deflecting rollers 49, 50 disposed above one another at an angle of 45 degrees with the conveyor belt 45, 46, and a reversing roller 51 disposed above the appropriate conveyor belt 45, 46 and having horizontal rotation shafts over which the conveyor belt 5 is guided, and a sixth conveyor

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6. System according to Claim 2, characterized in that the speeds of rotation of the non-common reduction elements of the pairs can be set independently of each other and relative to the common reduction element.

7. System according to Claim 2, characterized in that the reducing station is capable of deflecting the second outgoing layer in such a way that the conveyance directions of the second ingoing layer and the second outgoing layer are opposite.

8. System according to Claim 7, characterized in that the reducing station is capable of guiding the second outgoing layer over about half the circumference of a non-common reducing element.

9. System according to one of the preceding claims, in which the laminating station has a fifth conveyance means receiving the first outgoing layer, the conveyance direction of which conveyance means is at right angles to the conveyance direction of the second ingoing layer, and of which one discharge end ends above the third conveyance means for forming the second ingoing layer, by means of metering means, on the third conveyance means, characterized in that the laminating station is provided with deflection means which deflect the first outgoing layer through an angle of 90 degrees in a horizontal plane, and which deposit the deflected first outgoing layer onto the fifth conveyance means.

10. System according to Claim 9, in which the second conveyance means is an endless conveyor belt, characterized in that the deflection means are formed by a pair of deflection rollers disposed above one another and forming an angle of 45 degrees with the fifth conveyance means, for deflecting the fifth conveyance means, and a reversing roller which is disposed above the particular fifth conveyance means and having horizontal axes of rotation, over which the second conveyance means is guided, and a sixth conveyance means disposed between the rollers and the fifth conveyance means, the conveyance direction of said sixth conveyance means being such that it deflects the first outgoing layer via the deflection rollers through 90 degrees and subsequently deposits it on the fifth conveyance means.

AMENDED CLAIMS IN ACCORDANCE WITH RULE 86(2) EPC

1. System for forming a laminate consisting of dough and fat, comprising first and second reducing means which are each suitable for receiving a first and second ingoing layer consisting of dough and fat and for delivering a first and second outgoing layer respectively being less thick than the respective ingoing layers, a laminating station which is suitable for receiving the first outgoing layer, and for partially placing on each other parts of the first outgoing layer for forming and delivering the second ingoing layer, first and second conveyor means for conveying the first ingoing layer and the first outgoing layer in the same directions of conveyance, and third and fourth conveyance means for conveying the second ingoing layer and the second outgoing layer in parallel directions of conveyance, characterized in that the first and second reducing means are disposed in a single reducing station, the laminating station is suitable for delivering the second ingoing layer in a direction of conveyance opposed to the first outgoing layer, and the conveyance means are arranged essentially in one vertical plane.

2. System according to Claim 1, in which each of the first and second reducing means comprises a pair of rotatably driven reduction elements disposed opposite each other and rotating about a horizontal axis in opposing directions, at least one reduction element of each pair being a roller-type roll having supported on the periphery thereof rollers rotating about a horizontal axis, in such a way that there is a passage between the reduction elements of each pair for receiving therein the ingoing layer of the pair and delivering therefrom the outgoing layer of the pair,

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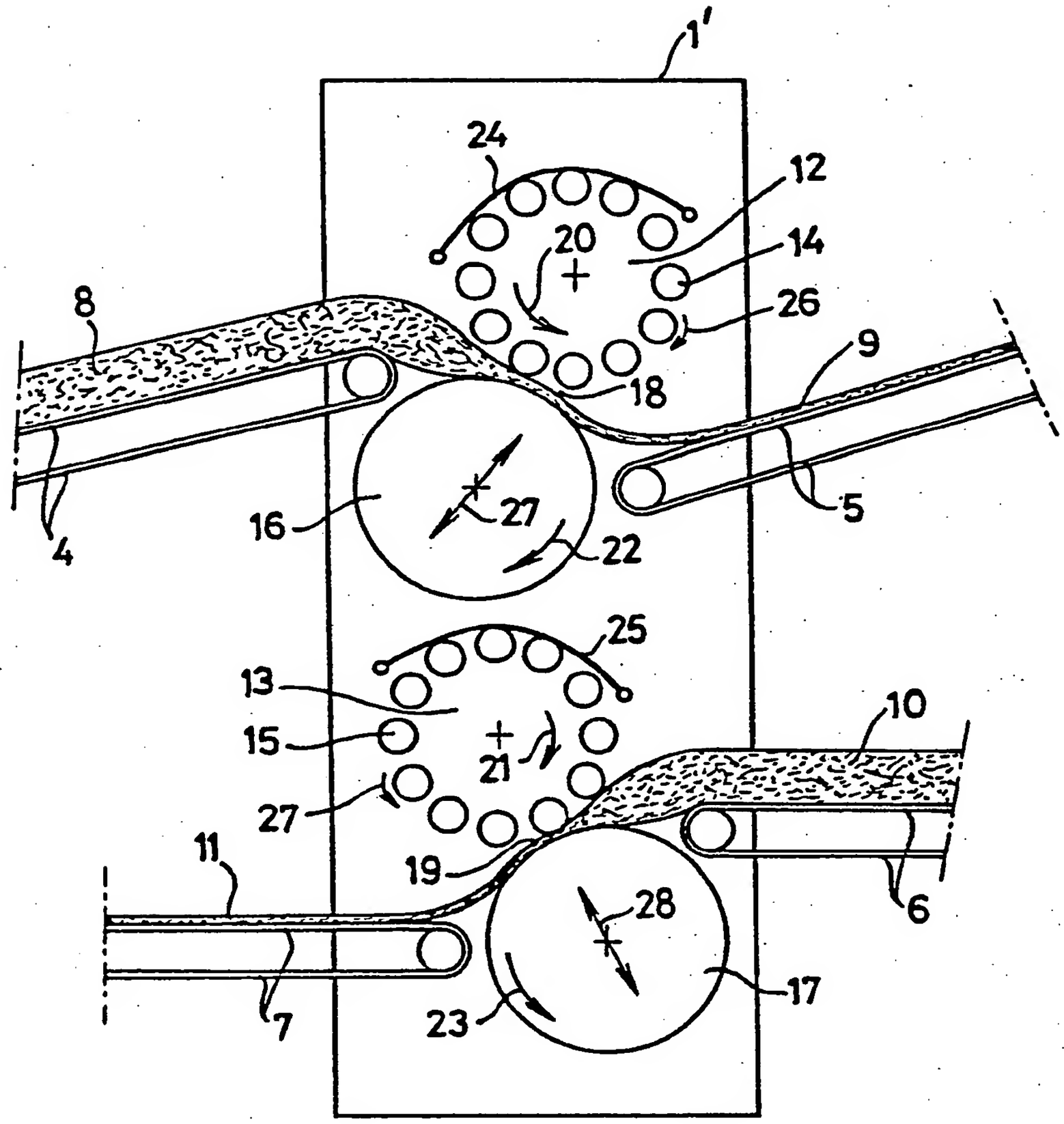

Fig. 4.

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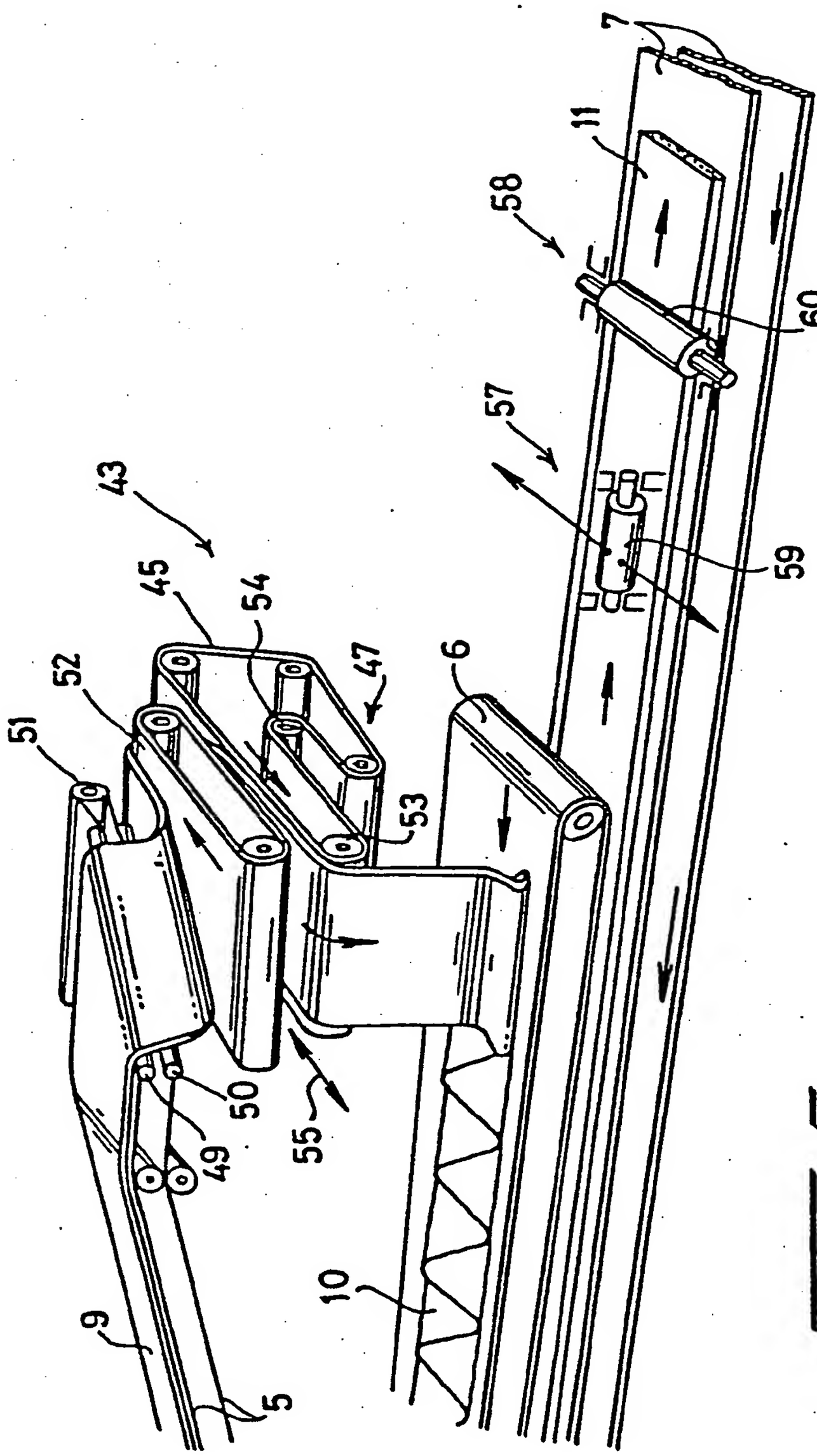

FIG. 5.

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EUROPEAN SEARCH REPORT

Application Number

EP 88 20 0126

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.4)
A	EP-A-0 239 154 (C RIJKAART) * Whole document *	1-10	A 21 C 3/02
A	DE-A-1 009 124 (J.F. NAYLOR) * Column 2, line 37 - column 3, line 3; figure 1 *	1-10	
A	FR-A-2 559 029 (J.P. LENFANT et al.)		
A	GB-A- 467 027 (K.D. LOOSE et al.)		
			TECHNICAL FIELDS SEARCHED (Int. Cl.4) A 21 C

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	23-09-1988	FRANKS N.M.

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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E : earlier patent document, but published on, or after the filing date
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